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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,138	09/18/2003	Serge Doucet	U 014823-0	5809

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EXAMINER	
GOLUB, MARCIA A	
ART UNIT	PAPER NUMBER
2828	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/665,138	DOUCET ET AL.	
	Examiner	Art Unit	
	Marcia A. Golub	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15 and 17-52* is/are pending in the application.

4a) Of the above claim(s) *4,5,10-14,23-27,35 and 36* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-9,15,17-22,28-34 and 37-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 11/16/06 have been fully considered but they are not persuasive.

Regarding the applicant's argument that MacCormack fails to disclose spatially separated portions of the gain medium where different wavelength resonate: applicant points out that the cavities disclosed in the reference are overlapping, however, overlapping is not an antonym for spatially separate, the resonant cavities such as 12-12 and 14-14 are of different length and do not overlap completely, since the cavity 14-14 occupies space outside the cavity 12-12, therefore the resonant cavities disclosed in the reference are spatially separate. Furthermore, the device disclosed by the applicant does not illustrate resonant cavities that are completely separate, i.e. in separate gain mediums, on the contrary figure 8 illustrates a plurality of overlapping gain cavities. Since the claims are interpreted in view of the specification, the term "spatially separate" is interpreted to include the meaning "partially overlapping".

Regarding the applicant's argument that Morin fails to disclose spatially separated portions of the gain medium where different wavelength resonate: the examiner points out that this reference is only used to illustrate chirped gratings and their advantage.

Regarding the applicant's argument that MacCormack fails to disclose a homogenously broadened grating, the examiner points to a reply presented in the previous office action

In the future the examiner requests that the arguments that the applicant would prefer to be addressed in detail should be put in the main body of the response, rather than in the footnotes.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 41, 42, 46, 47, 51 and 52 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification and Fig 11 disclose the Er-Yb doped fiber to be 8 cm long, while the actual gain medium defined by superstructure gratings is only 2 cm long. Therefore the applicant's claim that "the ratio of the number of wavelength to the length of the gain medium is at least 1 or 1.8 wavelength per cm of gain medium" is not supported by the original specification, since 8/2=4 and 15/2=7.5.

Furthermore, the specification discloses the length of the fiber to be 8 cm with an output of 8 or 15 wavelengths, depending on the length of the grating. The ratio of the number of wavelength to the length of the fiber therefore is equal to either 1 or 1.8, not greater than or equal to 1 or 1.8. These numbers are specific data points and cannot be described as open ended ranges ("at least 1" or "at least 1.8"), since there in no evidence to indicate that the ratio can be any other number besides 1 and 1.8.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 15-19, 22, 28-31, 28-34, 37 are rejected under 35 U.S.C. 102(b) as being anticipated by MacCormack et al. (6,407,855), hereinafter '855.

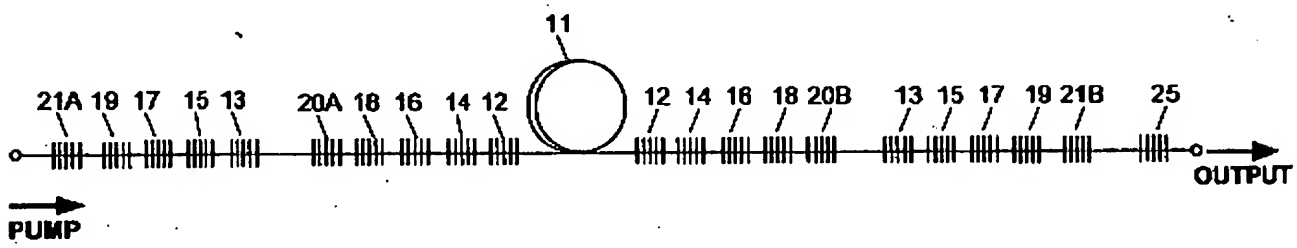
Regarding **claims 1, 2, 22 and 32**, Fig 2 of '855 discloses "a multi-wavelength laser source [10] comprising:

a) a pump laser unit adapted for generating an energy signal [pump]; (3/39-43)

b) a gain section including a gain medium [11] having an superstructure grating [12-21], said superstructure grating forming a plurality of cavities that are distributed in said gain medium such that different resonant wavelengths resonate in spatially

separated portions of said gain medium when the energy signal is applied to said gain section, the pump laser unit being adapted for applying the energy signal to said gain section such as to cause a multi-wavelength laser signal to be generated; (5/20-34)

c) an output for emitting the multi-wavelength laser signal [output];



Regarding **claims 3, 15-19, 28-31, 33, 34, 37**, Figs 1 and 6 of '855 disclose "a multi-wavelength laser source:

3, 37. "wherein the gain section further comprises an amplifying section (5/4)

15. "wherein the gain medium is selected from the set consisting of ... crystals, semiconductor materials [Ge and P] and doped polymer materials (5/20-24);

17. "wherein said gain section includes an optical waveguide [optical fiber] (5/20);

18. "wherein the optical waveguide includes ... an optical fiber (5/20);

19. "wherein said optical waveguide includes a waveguide core and a waveguide cladding; (5/20-22)

28. "An optical transmitter apparatus comprising the multi-wavelength laser source described in claim 1." Intended use of the device recited in the pre-amble that does not result in a structural difference of the device does not distinguish the invention over prior art. (*see MPEP 2111.03)*

29. "A device suitable for providing optical components characterization comprising the multi-wavelength laser source described in claim 1. (*see MPEP 2111.03)*

30. "A device suitable for providing temporal spectroscopy functionality comprising the multi-wavelength laser source described in claim 1 (*see MPEP 2111.03)*

31. "A device suitable for providing material characterization for non-linear effects comprising the multi-wavelength laser source described in claim 1 (*see MPEP 2111.03)*

33. "wherein the pump laser unit is positioned such as to generate the energy signal in a co-propagation relationship with the output; (Fig 1)

34. "wherein the pump laser unit is positioned such as to generate the energy signal in a counter-propagation relationship with the output." (Fig 6)

38,43, 48. "wherein the gain medium is a homogenously broadened gain medium [single mode fiber]." (5/20-24); (fiber based gain media are homogeneously broadened)

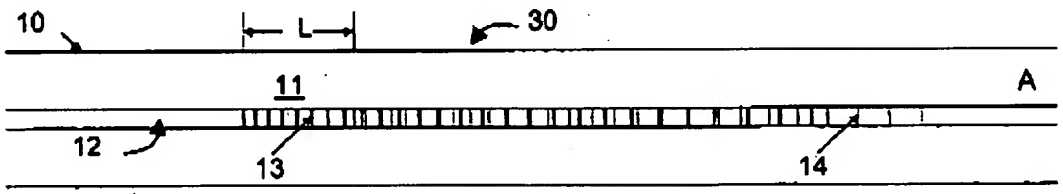
39, 44,49. "wherein the multi-wavelength signal is characterized by at least 8 laser wavelengths" Fig 2 discloses a laser with 10 output wavelengths.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6-9, 20, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over '855 as applied to claims 1 and 16-19 above, and further in view of Morin (2004/0037505), hereinafter '505.



Regarding **claims 6-9**, Fig 2 of '855 discloses a multi-wavelength laser source as described above, but does not disclose that superstructure grating is composed of two identical chirped Bragg grating overlapping each other. However Fig 1 of '505 disclose an optical fiber with a superstructure grating:

6. "wherein the superstructure grating comprises: a) a first grating segment [13]; b) a second grating segment [14] superposed at least in part on said first grating segment;

7. "wherein the first grating segment is a chirped Bragg grating; (paragraph 0037)

8. "wherein the second grating segment is a chirped Bragg grating;

9. "wherein the first grating segment and the second grating segment are

substantially similar to one another." (paragraph 0037)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of '505 into the device of '855 by making a superstructure grating that is composed of two identical chirped Bragg grating overlapping each other for at least the purpose of enhancing the tunability of the laser, reducing the physical size of the cavity and producing dispersion compensation.

Regarding **claims 20 and 21**, Fig 2 of '855 discloses a multi-wavelength laser source as described above, but does not disclose the precise location of the superstructure grating. However, paragraph 0037 of '505 discloses an optical fiber with a superstructure grating:

20. "wherein the superstructure grating is located in the waveguide core;

21. "wherein the superstructure grating is located in the waveguide cladding."

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of '505 into the device of '855 by making the superstructure grating in the cladding and in the core of the optical fiber for at least the purpose of avoiding cladding mode losses.

Claims 40, 45 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over '855 as applied to claims 38, 44 and 49 above.

Fig 2 of '855 discloses a multi-wavelength laser source as described above, but does not disclose:

40,45,50. "wherein the multi-wavelength signal is characterized by at least 15 laser wavelengths"

'855 discloses a laser with an output of 10 wavelengths. However, changing the disclosed laser output from 10 wavelength to 15 wavelengths would be a simple modification of adding 5 additional sets of gratings in the fiber gain medium, as suggested by the reference.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of '855 by adding 5 more pairs of gratings in the optical fiber for at least the purpose of producing a laser with a desired number of wavelengths output.

Claims 41, 42, 46, 47, 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over '855 as applied to claims 1 above, and further in view of Kringlebotn (5,844,927), hereinafter '927.

Fig 2 of '855 discloses a multi-wavelength laser source as described above, but does not disclose:

"wherein the gain medium has a length, the multi-wavelength laser signal is characterized by a number of laser wavelengths, and a ratio of the number of laser wavelengths to the length of the gain medium is at least 1.8 laser wavelength per cm of gain medium."

However, '855 discloses adjusting the length of the gain medium in order to minimize threshold while maximizing wavelength output (8/61-9/3). Since '855 discloses the number of wavelength to be 10 then the length of the gain medium has to be no more than 5.6 cm.

Furthermore, '927 discloses in col. 2 lines 2 and 3 that in order for the fiber laser to support multiple wavelength output it has to be at least 5 cm long. (10/5.6=1.8)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of '927 into the device of '855 by making the gain medium 5.6 cm long for at least the purpose of obtaining a multiple wavelength output while minimizing the threshold.

Contact Info

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marcia A. Golub whose telephone number is 571-272-8602. The examiner can normally be reached on M-F 9-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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